

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A processing apparatus, comprising:

a transfer chamber;

a plurality of processing chambers for processing therein a substrate to be processed, the processing chambers being coupled to the transfer chamber;

a plurality of shower heads, installed at upper parts of the processing chambers, for providing a gas to be converted into a plasma in the processing chambers;

a number of electrostatic chucks which are provided in the processing chambers, to electrostatically adsorb the substrate to be processed thereto;

a transfer mechanism installed in the transfer chamber to transfer the substrate to be processed between the processing chambers and the transfer chamber; and

a monatomic nitrogen atom supply unit for providing dissociated monatomic nitrogen atoms in the processing chambers, wherein the monatomic nitrogen atoms are provided in ~~one of the~~ each processing chambers chamber after finishing processing the substrate therein to remove charge on an electrostatic chuck provided in said ~~[[one]]~~ each processing chamber and the monatomic nitrogen atoms are dissociated before entering said each processing chamber,

wherein the monatomic nitrogen atom supply unit includes a pipe communicating with said each processing chamber through a sidewall of said each processing chamber, an N₂ gas supply source for supplying an N₂ gas through the pipe, and an energy supply unit for applying energy to the N₂ gas in the pipe to convert the N₂ gas into the dissociated monatomic nitrogen atoms,

wherein a height at which the pipe communicates with said each processing chamber is substantially equal to a height of the electrostatic chuck provided in said each processing chamber.

Claim 2 (Currently Amended): A processing apparatus, comprising:

a transfer chamber;

a processing chamber coupled to the transfer chamber, the processing chamber performing therein a process on a substrate to be processed;

a shower head, installed at an upper part of the processing chamber, for providing a gas to be converted into a plasma in the processing chamber;

a transfer mechanism installed in the transfer chamber for sequentially transferring the substrate to be processed into the processing chamber;

an electrostatic chuck provided in the processing chamber, the electrostatic chuck electrostatically adsorbing thereto the substrate to be processed; and

a monatomic nitrogen atom supply unit for providing dissociated monatomic nitrogen atoms in the processing chamber, wherein the monatomic nitrogen atoms are provided in the processing chamber after finishing processing the substrate therein to remove charge on the electrostatic chuck provided in the processing chamber and the monatomic nitrogen atoms are dissociated before entering the processing chamber,

wherein the monatomic nitrogen atom supply unit includes a pipe communicating with the processing chamber through a sidewall of the processing chamber, an N₂ gas supply source for supplying an N₂ gas through the pipe, and an energy supply unit for applying

energy to the N₂ gas in the pipe to convert the N₂ gas into the dissociated monatomic nitrogen atoms,

wherein a height at which the pipe communicates with the processing chamber is substantially equal to a height of the electrostatic chuck provided in the processing chamber.

Claim 3 (Original): The processing apparatus of claim 1, wherein the monatomic nitrogen atom supply unit supplies the dissociated monatomic nitrogen atoms to a close proximity of the electrostatic chucks.

Claim 4 (Original): The processing apparatus of claim 2, wherein the monatomic nitrogen atom supply unit supplies the dissociated monatomic nitrogen atoms to a close proximity of the electrostatic chucks.

Claim 5 (Previously Presented): The processing apparatus of claim 2, wherein the monatomic nitrogen atom supply unit provides the dissociated monatomic nitrogen atoms in the transfer chamber.

Claim 6 (Original): The processing apparatus of claim 2, further comprising a controller for controlling a supply timing of the dissociated monatomic nitrogen atoms from the monatomic nitrogen atom supply unit.

Claim 7 (Canceled).

Claim 8 (Previously Presented): The processing apparatus of claim 2, wherein the energy supply unit has an ultraviolet irradiation unit for irradiating ultraviolet ray to the N₂ gas.

Claim 9 (Previously Presented): The processing apparatus of claim 2, wherein the pipe has a dielectric portion, and the energy supply unit has an induction coil wound around the dielectric portion and a high frequency power supply for applying a high frequency to the induction coil.

Claim 10 (Currently Amended) The processing apparatus of claim 2, wherein the energy supply unit applies energy which is higher than the dissociation energy of the N₂ gas and lower than the ionization energy of the N₂ gas, to the N₂ gas.

Claim 11 (Withdrawn): A processing method employing a processing apparatus, which includes a transfer chamber, a plurality of processing chambers coupled to the transfer chamber, to process therein a target substrate, and a number of electrostatic chucks provided in the processing chambers to electrostatically adsorb the target substrate thereto, comprising the steps of:

transferring the target substrate from the transfer chamber into one of the processing chambers by using a transfer mechanism;

placing the target substrate on an electrostatic chuck displaced in said one processing chamber;

applying a direct current to an electrode embedded in the electrostatic chuck to electrostatically absorb the target substrate to the electrostatic chuck;

processing the target substrate in said one processing chamber, to thereby obtain a processed substrate;

terminating the application of the direct current to the electrostatic chuck;

supplying dissociated monatomic nitrogen atoms into said one processing chamber to remove charge on the electrostatic chuck; and

transferring the processed substrate into the transfer chamber using the transfer mechanism.

Claim 12 (Withdrawn): The processing method of claim 11, wherein the dissociated monatomic nitrogen atoms are supplied near the electrostatic chucks.

Claim 13 (Withdrawn): A processing method using a processing apparatus, which includes a transfer chamber, a first processing chamber coupled to the transfer chamber, for performing a first process on a target substrate therein, a second processing chamber coupled to the transfer chamber for performing a second process on the target substrate therein, and a first and second electrostatic chucks provided in the first and second processing chambers, respectively, to electrostatically adsorb the substrate thereto, comprising the steps of:

transferring the target substrate from the transfer chamber into the first processing chamber using a transfer mechanism;

placing the target substrate on the first electrostatic chuck in the first processing chamber;

applying a direct current to an electrode of the first electrostatic chuck to electrostatically adsorb the target substrate to the first electrostatic chuck;

performing a first process on the target substrate in the first processing chamber to thereby obtain a processed substrate;

terminating the application of the direct current to the first electrostatic chuck;

supplying dissociated monatomic nitrogen atoms into the first processing chamber to remove charge on the first electrostatic chuck;

transferring the processed substrate into the transfer chamber using the transfer mechanism;

transferring the processed substrate from the transfer chamber into the second processing chamber;

placing the processed substrate on the second electrostatic chuck in the second processing chamber;

applying the direct current to an electrode of the second electrostatic chuck to electrostatically adsorb the processed substrate to the second electrostatic chuck; and

performing a second process on the processed substrate in the second processing chamber.

Claim 14 (Withdrawn): The processing method of claim 13, wherein the dissociated monatomic nitrogen atoms are supplied near the electrostatic chucks.

Claim 15 (Withdrawn): The processing method of claim 13, further comprising the step of supplying the dissociated monatomic nitrogen atoms into the transfer chamber.

Claim 16 (Withdrawn): The processing method of claim 13, wherein the dissociated monatomic nitrogen atoms are produced by irradiating ultraviolet ray onto N₂ gas.

Claim 17 (Withdrawn): The processing method of claim 13, wherein the dissociated monatomic nitrogen atoms are produced by applying energy, generated during application of a high frequency power to an induction coil, onto N₂ gas.

Claim 18 (Withdrawn): The processing method of claim 13, wherein the dissociated monatomic nitrogen atoms are produced by applying energy, higher than dissociation energy of N₂ and lower than ionization energy of N₂, to the N₂ gas.

Claim 19 (Canceled).

Claim 20 (Withdrawn): A processing method employing a processing apparatus, which includes a processing chamber for processing a substrate to be processed and an electrostatic chuck, installed in the processing chamber, for adsorbing the substrate to be process thereto, comprising the steps of:

transferring the substrate to be processed into the processing chamber;
adsorbing the substrate to be processed to the electrostatic chuck;
processing the substrate; and then
supplying dissociated monatomic N atoms into the processing chamber.

Claim 21 (Currently Amended): A processing apparatus, which includes a processing chamber for processing a substrate to be processed, a shower head, installed at an upper part of the processing chamber, for providing a gas to be converted into a plasma in the processing chamber and an electrostatic chuck, installed in the processing chamber, for adsorbing the substrate to be process thereto, comprising:

means for transferring the substrate to be processed into the processing chamber;
means for adsorbing the substrate to be processed to the electrostatic chuck; and
means for providing dissociated monatomic nitrogen atoms in the processing chamber, wherein the monatomic nitrogen atoms are provided in the processing chamber after finishing processing the substrate therein and the monatomic nitrogen atoms are dissociated before entering the processing chamber,

wherein said means for providing dissociated monatomic nitrogen atoms includes a pipe communicating with the processing chamber through a sidewall of the processing chamber, an N₂ gas supply source for supplying an N₂ gas through the pipe, and an energy supply unit for applying energy to the N₂ gas in the pipe to convert the N₂ gas into the dissociated monatomic nitrogen atoms,

wherein a height at which the pipe communicates with the processing chamber is substantially equal to a height of the electrostatic chuck provided in the processing chamber.

Claim 22 (New): A processing apparatus, comprising:
a transfer chamber;
one or more processing chambers, each for processing therein a substrate to be processed, the processing chambers being coupled to the transfer chamber;

a shower head, installed at an upper part of each processing chamber, for providing a gas to be converted into a plasma in said each processing chamber;

a electrostatic chuck which is provided in said each processing chamber, to electrostatically adsorb the substrate to be processed thereto;

a transfer mechanism installed in the transfer chamber to transfer the substrate to be processed between the processing chambers and the transfer chamber;

a monatomic nitrogen atom supply unit for providing dissociated monatomic nitrogen atoms in the processing chambers, wherein the monatomic nitrogen atoms are provided in said each processing chamber after finishing processing the substrate therein to remove charge on the electrostatic chuck provided in said each processing chamber; and

an N₂ gas supply source for supplying an N₂ gas into said each processing chamber, which communicates with the shower head,

wherein the monatomic nitrogen atom supply unit includes an ultraviolet irradiation unit for irradiating ultraviolet ray to the N₂ gas provided in said each processing chamber, a power supply for supplying a power to the ultraviolet irradiation unit, and a controller for controlling the power supply, and

wherein the ultraviolet irradiation unit is provided at a sidewall of said each processing chamber such that the ultraviolet irradiation unit is positioned close to the electrostatic chuck.

Claim 23 (New): The processing apparatus of claim 22, wherein the monatomic nitrogen atom supply unit provides the dissociated monatomic nitrogen atoms in the transfer chamber.

Claim 24 (New): The processing apparatus of claim 22, wherein the controller further controls a supply timing of the N₂ gas from the N₂ gas supply source.